CLAIMS

1. A linear predictive system for a DC-DC converter that generates an output signal based on duty cycle and that includes a digital compensation block that converts a feedback error signal into a main duty cycle signal, said linear predictive system comprising:

   a linear predictive controller that predicts linear changes of the main duty cycle signal in response to changes of the output signal and that provides a predictive duty cycle signal indicative thereof;

   a first adder that subtracts said predictive duty cycle signal from the main duty cycle signal to provide a duty cycle delta;

   a multiplier that multiplies said duty cycle delta by a gain factor to provide a duty cycle delta sample; and

   a second adder that adds said duty cycle delta sample to the first duty cycle signal to generate an adjusted duty cycle signal.

2. The linear predictive system of claim 1, wherein said gain factor is less than one.

3. The linear predictive system of claim 1, wherein said linear predictive controller performs an inverse function of the DC-DC converter approximated to the first order.

4. A DC-DC converter, comprising:

a compensation block that converts a feedback error signal into a first duty cycle signal;

a first combiner that adds a duty cycle delta to said first duty cycle signal to generate an adjusted duty cycle signal;

a DC-DC block that generates an output signal based on said adjusted duty cycle signal;

a linear predictive controller that predicts changes of said first duty cycle signal in response to changes of said output signal and that provides a predictive duty cycle signal indicative thereof; and

a second combiner that subtracts said predictive duty cycle signal from said first duty cycle signal to provide said duty cycle delta.

5. The DC-DC converter of claim 4, further comprising a multiplier that multiplies said duty cycle delta by a loop gain factor to provide a modified duty cycle delta provided to said first combiner.

6. The DC-DC converter of claim 5, wherein said loop gain factor is between 0 and 1.

7. The DC-DC converter of claim 4, wherein said linear predictive controller performs an inverse function of said DC-DC block approximated to the first order.

8. The DC-DC converter of claim 4, further comprising a third combiner that subtracts said output signal from a reference signal to generate said feedback error signal.

9. A method of operating a DC-DC power converter, comprising:

converting a feedback error signal into a first duty cycle signal;

subtracting a duty cycle delta from the first duty cycle signal to provide an adjusted duty cycle signal;

generating an output signal based on the adjusted duty cycle signal;

linearly predicting changes of duty cycle in response to changes of the output signal to provide a predictive duty cycle; and

subtracting the predictive duty cycle from the first duty cycle signal to provide the duty cycle delta.

10. The method of claim 9, further comprising multiplying the duty cycle delta by a loop gain factor.

11. The method of claim 9, wherein said linearly predicting changes of duty cycle comprises performing an inverse function of said generating an output signal approximated to the first order.

12. The method of claim 9, further comprising subtracting the output signal from a reference signal to provide the feedback error signal.